Small Business Innovation Research/Small Business Tech Transfer

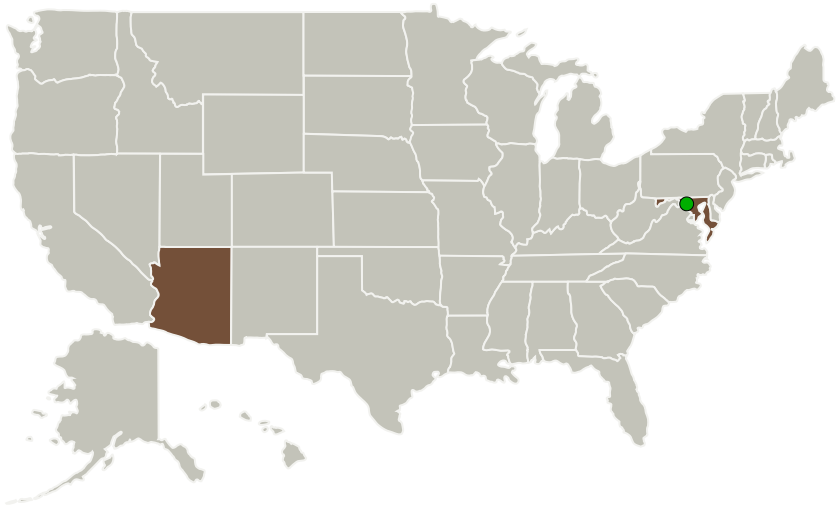
CMOS Compatible SOI MESFETs for Radiation Hardened DC-to-DC Converters, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

We have developed a novel metal-semiconductor field-effect-transistor (MESFET) technology suitable for extreme environment electronics. The MESFET technology is fully CMOS-compatible and can be integrated alongside conventional MOSFETs with no changes to the process flow. Unlike the MOSFETs however, the MESFETs do not require a fragile metal-oxide-semiconductor (MOS) interface and are extremely robust. With breakdown voltages in the range 10-50V the MESFET operating voltage greatly exceeds that of the accompanying CMOS. The combination of CMOS compatibility with high breakdown voltage allows for integrated DC-to-DC power conversion solutions that would otherwise require discrete components based on laterally diffused metal-oxide-semiconductor (LDMOS) devices. The MESFETs are intrinsically radiation tolerant up to 1 Mrad(Si) and have been demonstrated to work over the temperature range -196C to +150C. The Phase 1 R&D we are proposing will characterize the large signal switching performance of the SOI MESFETs for buck converter applications in extreme environments.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
SJT Micropower	Lead Organization	Industry	Fountain Hills, Arizona
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Arizona	Maryland

Project Transitions

February 2011: Project Start

August 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138040)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

SJT Micropower

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

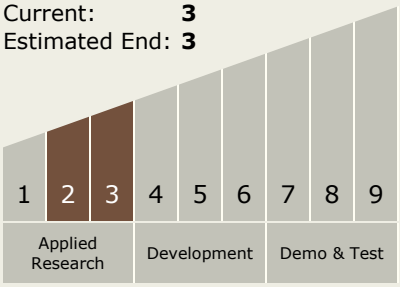
Carlos Torrez

Principal Investigator:

William J Lepkowski

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.1 Situational and Self Awareness
    - TX10.1.4 Hazard Assessment

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System